AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) A communications channel that receives a user data sequence including N symbols and that supports host CRC, comprising:

a host bus interface (HBI) that generates cyclic redundancy check (CRC_U) bits based on said user data sequence; and

a data dependent scrambler (DDS) that receives said user data sequence and said CRC_U bits, that ~~generates~~selects a scrambling seed based on the N symbols of said user data sequence, that generates a scrambled user data sequence based on said user data sequence and said scrambling seed, and that generates a difference sequence that is based on said user data sequence and said scrambled user data sequence.

2. (Original) The communications channel of Claim 1 wherein said DDS includes a CRC encoder that generates CRC_D bits that are based on said difference sequence.

3. (Original) The communications channel of Claim 2 further comprising an error correction coding (ECC)/CRC device that generates ECC and CRC_W bits based on said scrambled user data sequence, said CRC_U bits and said CRC_D bits from said DDS.

4. (Original) The communications channel of Claim 3 wherein said CRC_W bits are equal to CRC_U XOR CRC_D.

5. (Original) The communications channel of Claim 3 further comprising a run length limited (RLL) coding device that generates an RLL sequence based on said CRC_W bits and said ECC bits.

6. (Original) The communications channel of Claim 1 wherein said DDS includes:

a data buffer that receives said user data sequence;

a seed finder that generates said scrambling seed, which is dependent upon said symbols in said user data sequence; and

a scrambler that receives said user data sequence from said data buffer and said scrambling seed from said seed finder and that generates said scrambled user data sequence.

7. (Original) The communications channel of Claim 6 further comprising:

an H-code finder that generates a H-code, which is dependent upon said symbols in said user data sequence; and

an H-code encoder that receives said scrambled user data sequence and that increases a Hamming weight of said scrambled user data sequence using said H-code.

8. (Original) The communications channel of Claim 7 further comprising an interleave encoder that receives said scrambled user data sequence from said H-code encoder and that reduces the number of consecutive zeros in interleaved subsequences of said scrambled user data.

9. (Original) The communications channel of Claim 1 wherein said communications channel is implemented in a write path of a data storage system.

10. (Original) The communications channel of Claim 1 wherein said DDS generates said difference sequence by performing a bitwise exclusive (XOR) operation on said user data sequence and said scrambled user data sequence.

11. (Original) The communications channel of Claim 1 further comprising at least one of a buffer manager, a buffer and a disk formatter that is located between said HBI and said DDS.

12. (Withdrawn) A data dependent scrambler for a communications channel that receives a user data sequence including N symbols and host cyclic redundancy check (CRC_U) bits, comprising:

a data buffer that receives said user data sequence and said host CRC_U bits;

a seed finder that generates a scrambling seed that is dependent upon said symbols in said user data sequence;

a first scrambler that receives said user data sequence from said data buffer and said scrambling seed from said seed finder and that generates said scrambled user data sequence; and

a second scrambler that generates a difference sequence that is based on said user data sequence and said scrambled user data sequence.

13. (Withdrawn) The data dependent scrambler of Claim 12 further comprising:

an H-code finder that generates an H-code that is dependent upon said symbols in said user data sequence; and

an H-code encoder that receives said scrambled user data sequence and that increases a Hamming weight of said scrambled user data sequence using said H-code.

14. (Withdrawn) The data dependent scrambler of Claim 12 further comprising a CRC encoder that generates CRC_D bits based on said difference sequence.

15. (Withdrawn) The data dependent scrambler of Claim 14 wherein said scrambled user data sequence, said host CRC_U bits and said CRC_D bits are transmitted to an error correction coding (ECC)/CRC encoder.

16. (Withdrawn) The data dependent scrambler of Claim 15 wherein said ECC/CRC encoder generates CRC_W bits that are equal to CRC_U XOR CRC_D.

17. (Withdrawn) The data dependent scrambler of Claim 15 wherein said ECC/CRC encoder outputs said scrambled user data sequence to a run length limited (RLL) encoder that generates a RLL sequence that is based on said CRC_W bits and said ECC bits.

18. (Withdrawn) The data dependent scrambler of Claim 13 further comprising an interleaved encoder that receives said scrambled user data sequence from said Hamming weight code encoder and that reduces the number of consecutive zeros in interleaved subsequences of said scrambled user data.

19. (Withdrawn) The data dependent scrambler of Claim 12 wherein said data dependent scrambler is implemented in a write path of a data storage system.

20. (Withdrawn) The data dependent scrambler of Claim 12 wherein said first and second scramblers perform a bitwise exclusive (XOR) operation.

21. (Withdrawn) The data dependent scrambler of Claim 12 wherein said data dependent scrambler receives said user data sequence and said CRC_U bits from a host bus interface (HBI).

22. (Withdrawn) The data dependent scrambler of Claim 21 wherein at least one of a buffer manager, a buffer and a disk formatter is arranged between said HBI and said data dependent scrambler.

23. (Currently Amended) A communications channel that receives a user data sequence including N symbols and that supports host CRC, comprising:

interface means for generating cyclic redundancy check (CRC_U) bits based on said user data sequence; and

scrambling means for receiving said user data sequence and said CRC_U bits, for ~~generating~~selecting a scrambling seed based on the N symbols of said user data sequence,, for generating a scrambled user data sequence that is based on said user data sequence and said scrambling seed, and for generating a difference sequence that is based on said user data sequence and said scrambled user data sequence.

24. (Original) The communications channel of Claim 23 wherein said scrambling means includes encoding means for generating CRC_D bits based on said difference sequence.

25. (Original) The communications channel of Claim 24 further comprising generating means for generating ECC and CRC_W bits that are based on said scrambled user data sequence, said CRC_U bits, and said CRC_D bits from said scrambling means.

26. (Original) The communications channel of Claim 25 wherein said CRC_W bits are equal to CRC_U XOR CRC_D.

27. (Original) The communications channel of Claim 25 further comprising coding means for generating an RLL sequence based on said CRC_W bits and said ECC bits.

28. (Original) The communications channel of Claim 24 wherein said scrambling means includes:

buffer means for storing said user data sequence;

seed finding means for generating said scrambling seed that is dependent upon said symbols in said user data sequence; and

seed scrambling means for receiving said user data sequence from said data buffer and said scrambling seed from said seed finding means and for generating said scrambled user data sequence.

29. (Original) The communications channel of Claim 28 further comprising:

H-code finding means that generates an H-code, which is dependent upon said symbols in said user data sequence; and

H-code encoding means that receives said scrambled user data sequence for increasing a Hamming weight of said scrambled user data sequence using said H-code.

30. (Original) The communications channel of Claim 29 further comprising interleave encoding means that receives said scrambled user data sequence from said code encoding means for reducing the number of consecutive zeros in interleaved subsequences of said scrambled user data.

31. (Original) The communications channel of Claim 24 wherein said communications channel is implemented in a write path of a data storage system.

32. (Original) The communications channel of Claim 24 wherein said scrambling means generates said difference sequence by performing a bitwise exclusive (XOR) operation on said user data sequence and said scrambled user data sequence.

33. (Original) The communications channel of Claim 24 further comprising at least one of a buffer manager, a buffer and a disk formatter that is arranged between said interface means and said scrambling means.

34. (Withdrawn) A data dependent scrambler for a communications channel that receives a user data sequence including N symbols and host cyclic redundancy check (CRC_U) bits, comprising:

buffer means for storing said user data sequence and said host CRC_U bits;

seed finding means for generating a scrambling seed that is dependent upon said symbols in said user data sequence;

first scrambling means that receives said user data sequence from said data buffer and said scrambling seed from said seed finder for generating said scrambled user data sequence; and

second scrambling means for generating a difference sequence that is based on said user data sequence and said scrambled user data sequence.

35. (Withdrawn) The data dependent scrambler of Claim 34 further comprising:

H-code finding means for generating an H-code that is dependent upon said symbols in said user data sequence; and

H-code encoding means that receives said scrambled user data sequence for increasing a Hamming weight of said scrambled user data sequence using said H-code.

36. (Withdrawn) The data dependent scrambler of Claim 35 further comprising, encoding means for generating CRC_D bits that are based on said difference sequence.

37. (Withdrawn) The data dependent scrambler of Claim 36 wherein said scrambled user data sequence, said host CRC_U bits and said CRC_D bits are transmitted to encoding means for generating CRC_W bits that are equal to CRC_U XOR CRC_D.

38. (Withdrawn) The data dependent scrambler of Claim 37 wherein said ECC/CRC encoding means outputs said scrambled user data sequence to a run length limited (RLL) encoding means that generates a RLL sequence that is based on said CRC_W bits and said ECC bits.

39. (Withdrawn) The data dependent scrambler of Claim 35 further comprising interleaved encoding means that receives said scrambled user data sequence from said H-code encoding means for reducing the number of consecutive zeros in interleaved subsequences of said scrambled user data.

40. (Withdrawn) The data dependent scrambler of Claim 34 wherein said data dependent scrambler is implemented in a write path of a data storage system.

41. (Withdrawn) The data dependent scrambler of Claim 34 wherein said first and second scrambling means perform a bitwise exclusive (XOR) operation.

42. (Withdrawn) The data dependent scrambler of Claim 34 wherein said data dependent scrambler receives said user data sequence and said CRC_U bits from a host bus interface (HBI).

43. (Withdrawn) The data dependent scrambler of Claim 42 wherein at least one of a buffer manager, a buffer and a disk formatter is located between said interface means and said data dependent scrambler.

44. (Withdrawn) A method for coding a user data sequence including N symbols in a communications channel, comprising:

generating cyclic redundancy check (CRC_U) bits based on said user data sequence;

determining a scrambling seed;

generating a scrambled user data sequence that is based on said user data sequence and said scrambling seed; and

calculating a difference sequence.

45. (Withdrawn) The method of Claim 44 further comprising generating CRC_D bits that are based on said difference sequence.

46. (Withdrawn) The method of Claim 44 further comprising generating ECC bits and CRC_W bits that are based on said scrambled user data sequence, said CRC_U bits, and said CRC_D bits.

47. (Withdrawn) The method of Claim 46 wherein said CRC_W bits are equal to CRC_U XOR CRC_D.

48. (Withdrawn) The method of Claim 46 further comprising generating a run length limited (RLL) sequence based on said CRC_W bits and said ECC bits.

49. (Withdrawn) The method of Claim 44 further comprising:

generating said scrambling seed that is dependent upon said symbols in said user data sequence; and

scrambling said user data sequence and said scrambling seed.

50. (Withdrawn) The method of Claim 49 further comprising:

generating an H-code that is dependent upon said symbols in said user data sequence; and

encoding said scrambled user data sequence based on said H-code to increase a Hamming weight of said scrambled user data sequence.

51. (Withdrawn) The method of Claim 50 further comprising reducing the number of consecutive zeros in interleaved subsequences of said scrambled user data.

52. (Withdrawn) The method of Claim 44 wherein said communications channel is a write path of a data storage system.

53. (Withdrawn) The method of Claim 44 further comprising generating said difference sequence by performing a bitwise exclusive (XOR) operation on said user data sequence and said scrambled user data sequence.

54. (Withdrawn) A method of coding a user data sequence including N symbols and host cyclic redundancy check (CRC_U) bits in a communications channel, comprising:

receiving said user data sequence and said host CRC_U bits;

generating a scrambling seed that is dependent upon said symbols in said user data sequence;

generating a scrambled user data sequence based on said scrambling seed and said user data sequence; and

generating a difference sequence that is based on said user data sequence and said scrambled user data sequence.

55. (Withdrawn) The method of Claim 54 further comprising:

generating an H-code that is dependent upon said symbols in said user data sequence; and

increasing a Hamming weight of said scrambled user data sequence using said H-code.

56. (Withdrawn) The method of Claim 54 further comprising generating CRC_D bits that are based on said difference sequence.

57. (Withdrawn) The method of Claim 56 further comprising generating CRC_W bits that are equal to CRC_U XOR CRC_D.

58. (Withdrawn) The method of Claim 56 further comprising generating an RLL bits that are based on said CRC_W bits and said ECC bits.

59. (Withdrawn) The method of Claim 55 further comprising reducing the number of consecutive zeros in interleaved subsequences of said scrambled user data.

60. (New) The communications channel of claim 1 comprising:

an seed finder that generates said scrambling seed; and

a H-code encoder that generates H-code scrambled data symbols based on said seed.

61. (New) The communications channel of claim 60 further comprising a XOR gate that performs a bit-wise exclusive (XOR) operation on said user data sequence and said scrambling seed, wherein said H-code encoder generates said H-code scrambled data symbols based on output of said XOR gate.

62. (New) The communications channel of claim 60 further comprising a P-code encoder generates P-encoded data symbols based on said H-code scrambled data symbols.

63. (New) The communications channel of claim 62 further comprising a precoder in communication with said P-encoder, wherein said difference sequence is generated based on output of said precoder.